

TABLE 2.—Free-air resultant winds (meters per second) based on pilot-balloon observations made near 5 a. m. (E. S. T.) during October 1935

[Wind from N=360°, E=90°, etc.]

Altitude (m) m. s. l.	Albuquerque, N. Mex. (1,554 m)		Atlanta, Ga. (309 m)		Billings, Mont. (1,088 m)		Boston, Mass. (15 m)		Cheyenne, Wyo. (1,873 m)		Chicago, Ill. (192 m)		Cincinnati, Ohio (153 m)		Detroit, Mich. (204 m)		Fargo, N. Dak. (274 m)		Houston, Tex. (21 m)		Key West, Fla. (11 m)		Medford, Oreg. (410 m)		Murfrees- boro, Tenn. (180 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface.....	°	0.7	21	0.9	267	2.3	296	1.4	289	3.4	248	1.1	68	0.6	245	2.0	265	1.0	50	1.7	60	3.9	180	0.7	165	0.1
500.....	18	0.7	102	2.5	281	6.0	281	6.0	238	5.0	212	2.5	254	5.1	243	3.6	147	4.6	70	9.1	198	0.7	177	3.1	177	3.1
1,000.....	118	2.7	118	2.7	290	6.3	290	6.3	255	5.7	261	4.9	268	6.6	258	4.8	162	3.1	84	8.6	196	1.1	206	3.6	206	3.6
1,500.....	209	1.7	209	1.7	259	5.0	289	8.4	264	6.7	268	6.8	273	7.4	279	5.3	194	2.1	82	7.3	161	2.0	235	4.3	235	4.3
2,000.....	250	2.7	252	1.2	283	4.5	282	9.2	281	4.7	265	7.8	262	8.0	271	8.0	292	7.6	221	1.0	80	5.2	238	0.9	258	3.7
2,500.....	257	4.9	261	1.3	288	5.9	277	8.8	278	5.9	269	7.2	274	9.6	275	7.7	301	8.4	263	1.5	74	4.3	48	0.2	270	4.3
3,000.....	260	6.6	279	2.5	291	7.3	278	9.6	283	10.1	283	10.1	284	7.6	278	9.4	292	9.7	272	1.5	88	2.5	309	1.1	282	4.3
4,000.....	264	10.2	276	4.7	292	6.9	275	6.1	275	6.1	339	8.0	339	8.0	303	7.8	292	9.7	285	2.6	336	3.6	298	2.6	298	2.6
5,000.....	270	11.0	270	11.0	284	5.9	284	5.9	268	6.1	268	6.1	268	6.1	268	6.1	268	6.1	277	5.0	277	5.0	277	5.0	277	5.0

  

Altitude (m) m. s. l.	Newark, N. J. (14 m)		Oakland, Calif. (8 m)		Oklahoma City, Okla. (402 m)		Omaha, Nebr. (306 m)		Pearl Har- bor, Terri- tory of Hawaii <sup>1</sup> (68 m)		Pensacola, Fla. <sup>1</sup> (24 m)		St. Louis, Mo. (170 m)		Salt Lake City, Utah (1,294 m)		San Diego, Calif. (15 m)		Sault Ste. Marie, Mich. (198 m)		Seattle, Wash. (14 m)		Spokane, Wash. (603 m)		Washing- ton, D. C. (10 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface.....	314	1.3	36	0.8	143	2.6	149	1.7	13	1.9	52	3.9	180	0.8	151	3.3	70	1.5	104	0.8	164	0.7	82	1.9	325	0.9
500.....	295	5.3	353	2.1	174	7.3	204	3.1	71	2.3	102	5.6	193	3.9	229	2.6	229	2.6	214	2.4	214	2.4	198	2.6	288	2.7
1,000.....	295	5.6	344	2.8	202	12.2	233	4.9	64	1.5	128	2.6	247	5.3	357	1.3	357	1.3	259	2.5	205	2.5	198	2.6	294	4.3
1,500.....	288	7.8	340	2.9	225	9.6	260	6.0	357	0.5	147	1.7	259	5.6	158	4.5	354	1.8	275	7.1	220	4.1	232	3.9	291	4.9
2,000.....	286	7.4	333	2.3	247	8.7	294	6.3	254	1.0	49	0.9	270	7.2	195	4.0	358	1.6	293	7.3	238	4.5	262	4.4	286	5.6
2,500.....	300	6.2	334	3.1	262	7.9	309	7.2	279	0.6	21	1.9	285	9.2	228	3.2	296	2.0	286	7.8	254	6.2	273	5.1	275	6.2
3,000.....	325	2.1	325	2.1	281	6.1	291	8.3	252	1.2	7	1.7	293	11.4	259	3.1	314	2.4	280	4.6	268	8.4	277	6.6	278	8.2
4,000.....	325	2.1	325	2.1	286	5.6	293	8.5	321	2.9	321	2.9	298	9.7	279	4.0	297	5.5	297	5.5	297	5.5	297	5.5	297	5.5
5,000.....	305	3.7	305	3.7	305	3.7	305	3.7	305	3.7	305	3.7	305	3.7	305	3.7	305	3.7	305	3.7	305	3.7	305	3.7	305	3.7

<sup>1</sup> Navy stations.

## RIVERS AND FLOODS

[River and Flood Division, MONTROSE W. HAYES, in charge]

By RICHMOND T. ZOCH

Except for a flood in the Chenango River in New York, there were no floods in the United States during October 1935; the damage from this flood was about \$90,000.

Table of flood stages in October 1935

[All dates in October]

River and station	Flood stage	Above flood stages— dates		Crest	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE	<i>Feet</i> 8				
Chenango: Sherburne, N. Y -----		31	31	<i>Feet</i> 9.7	31

## WEATHER OF THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, W. F. McDONALD in charge]

## NORTH ATLANTIC OCEAN, OCTOBER 1935

By H. C. HUNTER

**Atmospheric pressure.**—The mean pressure was somewhat above normal over most of the North Atlantic area, notably near the Azores, where at Horta it averaged almost a quarter inch higher than normal. The north-eastern portion, however, had pressure lower than normal; Lerwick, in the Shetland Islands, reported one-third of an inch below. There were also very small deficiencies at Bermuda and Turks Island.

The highest barometer reading so far reported from the open North Atlantic was 30.76 inches, on the American steamship *Afoundria*, near 43° N., 21° W., during the forenoon of the 28th. On the 30th the station on Belle Isle noted 30.80 inches; and a vessel in the Gulf of St. Lawrence, 30.83 inches. The lowest reading was 28.03 inches, on the Danish motorship *Oregon*, the afternoon of the 18th, near 60° N., 20° W. No vessel within the influence of any of this month's storms of tropical origin has reported a reading below 28.70 inches.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, October 1935

Station	Average pressure	Departure	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Julianehaab, Greenland.....	29.55		30.06	2	29.07	6
Reykjavik, Iceland.....	29.47	-0.21	30.01	20	28.83	8
Lerwick, Shetland Islands.....	29.46	-0.33	29.98	25	28.30	19
Valencia, Ireland.....	29.85	-0.06	30.38	17	28.87	3
Lisbon, Portugal.....	30.13	+0.11	30.54	23	29.63	4
Madeira.....	30.12	+0.13	30.33	28	29.89	4
Horta, Azores.....	30.34	+0.23	30.58	25	29.97	31
Belle Isle, Newfoundland.....	30.01	+0.14	30.80	30	29.48	26
Halifax, Nova Scotia.....	30.16	+0.12	30.68	30	29.64	19
Nantucket.....	30.18	+0.13	30.54	30	29.64	2
Hatteras.....	30.17	+0.11	30.48	17	29.79	3
Bermuda.....	30.06	-0.01	30.28	21, 29	29.84	16
Turks Island.....	29.94	-0.01	30.04	28, 29	29.82	19
Key West.....	29.98	+0.04	30.13	30	29.80	1
New Orleans.....	30.09	+0.06	30.34	25	29.85	3

NOTE.—All data based on a. m. observations only, with departures compiled from best available normals related to time of observation, except Hatteras, Key West, Nantucket, and New Orleans, which are 24-hour corrected means.

**Cyclones and gales.**—During the first few days, pressure was decidedly low in the region toward the British Isles. The storm center moved slowly southward until the 3d, then took a northeastward course, decreasing in energy. Several vessels east of mid-ocean noted forces 11 or 10, and the American motorship *Vistula* estimated force 12.

About the 15th a storm between Bermuda and the eastern coast of the United States developed much energy as it advanced northeastward. In connection with a marked high moving eastward over southern Canada, intense gales were met in the waters to southward or eastward of Nova Scotia; the American steamship *Executive* estimated force 12, the only occurrence of this force reported from Atlantic waters during the portion of the month after the 4th. It is possible, but not certain that this storm is the same as the one which caused the loss of the British steamship *Vardulia* on the 19th, near 58° N., 18°30' W. Reports by wireless to other craft in the vicinity indicated that the ship was being abandoned, but vessels that hastened to give assistance found no trace of the ship or crew. The storm center advanced eastward from near the position just stated, passing close to the Shetlands, and reaching the southern Scandinavian Peninsula late on the 19th with great intensity.

Along the chief steamship lanes, and particularly to northward of the fiftieth parallel, there were numerous gales on the last 2 days of October, chiefly near mid-ocean. At this time pressure was decidedly high near Labrador, and a marked low was centered near the British Isles.

**Tropical storms.**—The month began with an intense storm of tropical origin moving northward well north of Bermuda. Three vessels between the thirty-ninth and forty-fifth parallels of latitude estimated force 12 on the 1st, in connection with this storm, which was discussed at length in the September Review.

The closing fortnight of October saw the development and movement over an unusual path sharply recurved to the left, and finally the dissipation, of a moderately energetic hurricane in the western Caribbean region. Chart IX presents the situation on the 18th and, besides indicating the hurricane, shows the conditions several hundred miles south of Iceland, where the *Vardulia*, as already mentioned, was encountering severe weather.

Charts X, XI, and XII, for the 21st, 23d, and 25th, respectively, portray the further development and the unusual track of the Caribbean storm, which is fully described elsewhere in this issue. One small ship and crew was lost in the course of this hurricane, and much damage and loss of life occurred on the islands, largely because of floods.

Just before the month ended, a storm of considerable force, probably not of tropical origin but in all respects similar to the typical West Indian hurricane, appeared in the vicinity of Bermuda. This storm moved westward toward the North Carolina coast, and there took a most extraordinary course southward to pass over the northwestern Bahamas and southern Florida, in each of which regions there was much destruction and some loss of life. The disturbance finally died out about November 8, in the eastern Gulf of Mexico. A full account of this storm will appear in the next issue of the REVIEW.

**Fog.**—Fog showed the usual seasonal decrease as compared with conditions in September. The decrease between the thirtieth meridian and the coasts of the British Isles and Europe was notable.

The 5°-square from 40° to 45° N., 45° to 50° W., led in the number of days of fog, reporting 10, or practically normal for this locality.

To southward of Nova Scotia there was but little fog during October. In the northwestern Gulf of Mexico, however, the 23d brought the first fog noted over any Gulf waters for many months.

The British steamship *Berwindlea* grounded on a small island adjacent to Nova Scotia, probably on the 23d, during dense fog. Vessel and cargo of paper were a total loss.

## OCEAN GALES AND STORMS, OCTOBER 1935

Vessel	Voyage		Position at time of lowest barometer		Gale began October	Time of lowest barometer October	Gale ended October	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN													
Adria, Ger. M. S.	Baytown, Tex.	Hamburg	39 05 N.	64 00 W.	1	11a, 1	1	Inches 29.14	ENE	N, 11	WSW	NNW, 12	ENE-N-WNW.
Eglantine, Am. S. S.	Houston	Havre	42 12 N.	59 32 W.	1	5p, 1	1	28.70	SE	SW, 12	WSW	WSW, 12	SSE-SW-WSW.
Manhattan, Am. S. S.	Cobb	New York	44 00 N.	57 15 W.	1	11p, 1	2	29.15	ESE	SE, 11	W	SSE, 12	ESE-SSE-W.
Emanuel Nobel, Belg. S. S.	Antwerp	do	49 22 N.	21 30 W.	2	8p, 2	3	29.31	W	W, 11	NNW	WNW, 11	W-WNW.
Black Osprey, Am. S. S.	Rotterdam	do	50 32 N.	16 57 W.	2	Mdt, 2	3	29.00	WNW	NNW, 9	N	W, 10	W-WNW-N.
Black Tern, Am. S. S.	New York	Antwerp	49 29 N.	17 39 W.	2	4a, 3	4	29.28	NW	WNW, 10	N	WNW, 10	NW - WNW-NNW.
Atlanta City, Am. S. S.	Cristobal	London	48 40 N.	10 00 W.	2	6a, 3	3	28.83	WNW	W, 10	N	NNW, 10	W-NNW.
Vistula, Am. M. S.	Baytown, Tex.	Rotterdam	48 50 N.	11 13 W.	2	9a, 4	5	29.42	NNW	NNW, 11	N	NNW, 12	None.
Imlay, Am. S. S.	Tampico	Baltimore	24 25 N.	80 58 W.	6	7a, 6	6	30.00	NE	NE, 4	NE	NE, 8	None.
Kentucky, Dan. S. S.	Copenhagen	St. Johns, N. F.	55 10 N.	33 20 W.	7	10a, 6	7	29.70	WNW	WNW, 5	WNW	WNW, 10	Steady.
Pres. Harrison, Am. S. S.	Gibraltar	New York	41 32 N.	65 22 W.	7	2p, 7	7	29.58	NE	NE, 9	NNW	NNE, 10	NE-N.
Uganda, Br. S. S.	Glasgow	Montreal	56 20 N.	18 04 W.	8	Noon, 9	9	29.17	W	WNW, 7	WNW	WNW, 9	W-WNW.
Caledonia, Br. S. S.	do	New York	55 18 N.	12 13 W.	10	2p, 10	10	29.11	W	W, 8	NW	NW, 8	W-WNW.
Europa, Ger. S. S.	Cherbourg	do	47 32 N.	34 56 W.	11	11p, 11	12	29.58	SSW	SW, 9	W	SW, 9	SSW-SW-W.
Uganda, Br. S. S.	Glasgow	Montreal	55 50 N.	35 04 W.	13	4a, 13	13	29.42	WSW	WSW, 9	WNW	WSW, 9	WSW-W.
West Isles, Am. S. S.	Trinidad	Halifax	38 00 N.	63 48 W.	16	8p, 15	17	29.71	N	N, 6	NNE	N, 10	S-N.
Rex, Ital. S. S.	Gibraltar	New York	38 10 N.	59 31 W.	16	2a, 16	16	29.20	W	SSW, 6	NNW	NNW, 8	S-SSW-W.
Executive, Am. S. S.	do	do	37 41 N.	59 49 W.	15	do	17	29.52	SE	SW, 7	NE	N, 12	SE-SW-NNW.

<sup>1</sup> Position approximate.